

Claims

- 1 1. A process for fabricating an electro-optic device, comprising: a) providing
2 a substrate comprising at least two polymer micro-ridges, wherein each polymer micro-
3 ridge comprises an upper surface and two walls, the two walls forming an angle with a
4 lower surface; b) depositing a metal thin film on the upper surface, the two walls, and the
5 lower surface; c) etching a predetermined amount of the deposited metal thin film on the
6 lower surface, thereby forming two electrodes separated by a gap; d) depositing a
7 nonlinear optical polymer in the gap between the two electrodes; and e) poling the
8 nonlinear optical polymer to induce electro-optic activity.
- 1 2. The process of Claim 1, further comprising dry etching the electro-optic
2 polymer so that the surface of the electro-optic polymer is substantially co-planar with
3 the upper surface of the polymer micro-ridge.
- 1 3. The process of Claim 2, further comprising etching a predetermined
2 amount of the deposited metal thin film on the upper surface.
- 1 4. The process of Claim 3, wherein etching a predetermined amount of the
2 deposited metal thin film on the lower surface, the deposited metal thin film on the upper
3 surface, or both according to a process comprises wet etching, dry etching, ion beam
4 bombardment, or any combination thereof.
- 1 5. The process of Claim 1, wherein the width of the gap is about 2 μm to
2 about 500 μm .
- 1 6. The process of Claim 1, wherein the polymer micro-ridge comprises a
2 linear polymer, a crosslinked polymer, an organically modified sol-gel, or any
3 combination thereof.
- 1 7. The process of Claim 1, wherein the width of each polymer micro-ridge is
2 about 2 μm to about 500 μm and the height of each of the two walls is about 200 nm to
3 about 10 μm .

1 8. The process of Claim 1, wherein the angle between the two walls and the
2 lower surface is about 90 degrees.

1 9. The process of Claim 1, wherein the upper surface and lower surface are
2 substantially parallel.

1 10. The process of Claim 1, wherein depositing the metal thin film according
2 to a process comprising physical vapor deposition, thermal evaporation, or any
3 combination thereof.

1 11. The process of Claim 1, wherein the metal thin film is selected from the
2 group consisting of gold, platinum, titanium, and any combination thereof.

1 12. The process of Claim 1, wherein etching a predetermined amount of the
2 deposited metal thin film on the lower surface comprises wet etching, dry etching, ion
3 beam bombardment, or any combination thereof.

1 13. The process of Claim 1, wherein the lower surface comprises silicon
2 dioxide.

1 14. The process of Claim 1, wherein the lower surface comprises a polymer.

1 15. The process of Claim 1, wherein the polymer micro-ridge and the lower
2 surface comprise the same polymer.

1 16. The process of Claim 1, wherein the nonlinear optical polymer comprises
2 a linear polymer, a crosslinkable polymer, an organically modified sol gel, or any
3 combination thereof.

1 17. The process of Claim 1, wherein the nonlinear optical polymer is
2 crosslinkable.

1 18. The process of Claim 17, further comprising crosslinking the nonlinear
2 optical polymer.

1 19. The process of Claim 18, wherein crosslinking the nonlinear optical
2 polymer occurs before poling, during poling, after poling, or any combination thereof.

1 20. The process of Claim 17, wherein crosslinking comprises exposing the
2 nonlinear optical polymer to heat, actinic radiation, or any combination thereof.

1 21. The process of Claim 1, wherein the index of refraction of the nonlinear
2 optical polymer is higher than the index of refraction of the lower surface.

1 22. The process of Claim 1, wherein the substrate comprises more than two
2 polymer micro-ridges.

1 23. The process of Claim 22, wherein the length of the polymer micro-ridges
2 is about 2 μm to about 300 mm.

1 24. The process of Claim 23, wherein the polymer micro-ridges are
2 interdigitated.